

REMARKS

This amendment is in response to the Office Action of April 14, 2004.

Claims 1, 2, 4, 6 through 13, 15, 17 through 23, 25, 27 through 33, 35, 37 through 45, 47, 49 through 51, 53, 55, 56 and 76 through 84 are currently pending in the application.

35 U.S.C. § 102(e) Anticipation Rejections

Anticipation Rejection Based on Miyamoto et al. (U.S. Patent 6,342,434)

Claims 1, 2, 4, 6, 9, 23, 25, 27, 30, 33, 35, 37, 40, 43, 44, 45, 47, 49, 51, 53 and 55 are rejected under 35 U.S.C. § 102(e) as being anticipated by Miyamoto et al. (U.S. Patent 6,342,434). The Office Action asserted that Miyamoto et al. discloses a method for thinning and dicing a wafer wherein the wafer has a surface with bumps that is covered by an adhesive tape with an adhesive coated on a backing such that the adhesive conforms to the shape of the bumps and the backing remains planar, the wafer is mounted on a vacuum suction table such that the backing of the tape abuts the vacuum table and is held against it by suction, the other side of the wafer is then thinned to remove some of the wafer material while being held to the vacuum suction table, after thinning, the adhesive tape is removed from the wafer, and then the wafer is diced into individual chips. Office Action of April 14, 2004 [hereinafter, Office Action], p. 3. Applicants respectfully traverse this rejection, as hereinafter set forth.

Applicants assert that a claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference. *Verdegaal Brothers v. Union Oil Co. of California*, 2 USPQ2d 1051, 1053 (Fed. Cir. 1987). The identical invention must be shown in as complete detail as is contained in the claim. *Richardson v. Suzuki Motor Co.*, 9 USPQ2d 1913, 1920 (Fed. Cir. 1989).

Applicants assert that Miyamoto et al. does not anticipate the aforementioned claims under 35 U.S.C. § 102. Interpreting the Applicants' claims in light of the specification, as noted in the August 12, 2003 Office Action on pages 3 and 4, the adhesive in the Applicants' invention is not required to contact the "actual" surface of the wafer. Miyamoto et al. requires that the adhesive be in contact with the "actual" surface of the wafer. "[T]he thickness of the adhesive member provided on the base should be equal to or larger than the height of the bumps."

Column 3, Lines 40-42. “If the thickness of the adhesive member provided on the base is made equal to or larger than the height of the bumps formed on the semiconductor wafer, the entire carrier is made in intimate contact with the semiconductor wafer . . .” Column 5, Lines 28-32. As is discussed below in the regarding the rejection of some claims under 35 U.S.C. § 103, Miyamoto et al. discloses the purpose for the “intimate contact” between the wafer and the adhesive. Applicants’ claimed invention does not require contact with the “actual” surface of the wafer, Miyamoto et al. does. Clearly, the Applicants’ invention and the invention disclosed in Miyamoto et al. are not “identical,” and every element of the Applicants’ claims, in light of the specification, are not expressly or inherently described. Therefore, none of the Applicants’ claims are anticipated by Miyamoto et al. under 35 U.S.C. § 102. Applicants request the allowance of claims 1, 2, 4, 6, 9, 23, 25, 27, 30, 33, 35, 37, 40, 43, 44, 45, 47, 49, 51, 53 and 55 and the case passed for issue.

35 U.S.C. § 103(a) Obviousness Rejections

Obviousness Rejection Based on Miyamoto et al. (U.S. Patent 6,342,434)

Claims 7 through 13, 15, 17 through 22, 28 through 32, 38 through 42, 50 and 56 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Miyamoto et al. (U.S. Patent 6,342,434). Claim 12 is the only independent claim rejected for obviousness based solely upon Miyamoto et al. The Office Action asserted that it would have been obvious to one of ordinary skill in the art to provide the adhesive to the active surface of the wafer and then apply the backing in the method of Miyamoto et al. Office Action, p. 4. Applicants respectfully traverse this rejection, as hereinafter set forth.

Applicants assert that to establish a *prima facie* case of obviousness under 35 U.S.C. § 103 three basic criteria must be met. First, there must be some suggestion or motivation, either in the reference itself or in the knowledge generally available to one of ordinary skill in the art, to modify the reference. Second, there must be a reasonable expectation of success. Third, the cited prior art reference must teach or suggest all of the claim limitations. Furthermore, the suggestion to make the claimed combination and the reasonable expectation of success must both

be found in the prior art, and not based on Applicants' disclosure. None of the above criteria have been established.

The argument in the Office Action concerning claim 12 is moot in light of the differences between the method of Miyamoto et al. and the Applicants' claimed method wherein Miyamoto et al. does not teach or suggest the claim limitations. Miyamoto et al. clearly teaches that a thick adhesive is needed to prevent the warping of the wafer during thinning from the release of the internal stresses inherent in the passivation film. Column 4, Lines 53-60. Miyamoto et al. teaches that the adhesive needs to be in full contact with the surface of the wafer. Column 5, Lines 28-32. This allows the adhesive or resin to act on the passivation film. Column 18, Lines 14-18. The adhesive or resin and the rigidity of the backing combine to "suppress the release of stress in the passivation film." Column 18, Lines 38-45. Otherwise, the "wafer would be warped when thinned." Column 18, Lines 29-34. Miyamoto et al. clearly teaches away from the adhesive not being required to contact the "actual" surface of the wafer, because Miyamoto et al. suggests the Applicants' method would result in warping of the wafer. There is no suggestion or teaching in Miyamoto et al. of all of the elements of the Applicants' invention and therefore a *prima facie* case of obviousness under 35 U.S.C. § 103 regarding the claimed invention has not been established.

Miyamoto et al. may teach that warping due to the release of stress in the passivation layer is only an issue when grinding below about 12 mils, and therefore it is possible that Miyamoto et al. only requires "intimate contact" when thinning below 12 mils. Column 1, Lines 33-51. Therefore, it could be construed that "intimate contact" is not required when grinding above about 12 mils. However, that is essentially a moot point because wafers are generally not bumped until the wafer is thinned to about 12 mils.

Applicants respectfully submit that claim 12 is allowable and that all of the dependent claims therefrom are allowable, as well as, all of the dependent claims from the other independent claims that were not rejected for obviousness under 35 U.S.C. § 103. Applicants assert that claims 7 through 13, 15, 17 through 22, 28 through 32, 38 through 42, 50 and 56 are clearly allowable over the cited prior art.

Obviousness Rejection Based on Miyamoto et al. (U.S. Patent 6,342,434) in view of Satoh (U.S. Patent 6,338,980)

Claims 76 through 84 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Miyamoto et al. (U.S. Patent 6,342,434) in view of Satoh (U.S. Patent 6,338,980). The Office Action notes that Miyamoto et al. is silent towards the adhesive tape only contacting 10% to 60% of the surface area of the bumps and rather teaches the adhesive contacting the entire exposed surface area of the bumps. Office Action, p. 5. However, the Office Action asserted that one skilled in the art would have readily appreciated that contact with the entire exposed surface area of the bumps is not necessary as suggested in Satoh. Office Action, p. 5. Satoh allegedly teaches applying an adhesive tape to a bumped surface of a wafer wherein the adhesive only contacts 10% to 60% of the surface area of the bump and then mounting the tape to a vacuum suction table to hold the wafer while the opposite surface is thinned. Office Action, p. 5. It is alleged that it would have been obvious to one of ordinary skill in the art at the time the invention was made that attaching the adhesive to 10% to 60% of the surface area of the bumps results in sufficient adhesion for the thinning process in the method of Miyamoto et al. as suggested in Satoh. Office Action, p. 5. Applicants respectfully traverse this rejection, as hereinafter set forth.

Applicants further submit that to establish a *prima facie* case of obviousness under 35 U.S.C. § 103 three basic criteria must be met. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. Second, there must be a reasonable expectation of success. Third, the cited prior art reference must teach or suggest all of the claim limitations. Furthermore, the suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art, and not based on Applicants' disclosure. None of the above criteria have been established. Applicants submit that claims 76 through 84 are clearly allowable over the cited prior art.

First, a *prima facie* case of obviousness under 35 U.S.C. § 103 has not been established regarding the claimed invention because there is no suggestion or motivation in Satoh and Miyamoto et al. to combine the teachings of the references. As discussed previously, Miyamoto et al. clearly teaches that a thick adhesive is needed to prevent the warping of the wafer during

thinning from the release of the internal stresses inherent in the passivation film. Miyamoto et al. clearly teaches away from the adhesive only contacting “about 10% to about 60%” of the surface area of the bumps. Therefore, there is no motivation or teaching to combine and a prima facie case of obviousness has not been established. Additionally, Satoh does not teach contacting only “about 10% to about 60%” of the surface area of the bumps.

Satoh et al. teaches two methods of thinning a wafer with electrode bumps on it. The first method involves coating the wafer with enough resin so that either the bump is fully encased in resin or all but the tip of the bump is encased in resin. Column 7, Lines 33-37 and Column 11, Lines 8-12. Adhesive tape is laid across the resin and the tip of the bumps, if any of the bump is exposed, and then the inactive surface is ground. Column 8, Lines 1-3. The second method involves coating the wafer with a layer of flux or photoresist and then applying a thick adhesive tape to the bumps. Neither method teaches contacting only “about 10% to about 60%” of the surface area of the bumps.

Starting with the second method, Satoh clearly teaches away from contacting only “about 10% to about 60%” of the surface area of the bumps. Figure 14B illustrates the second method of Satoh. As shown in Figure 14B the layer of flux or photoresist is thin, and the adhesive is thick. The adhesive clearly contacts more than “about 10% to about 60%” of the surface area of the bumps. Figure 14B shows a small gap between the flux layer and the adhesive. The text makes clear that “the process where the second adhesive tape is attached to the active face 1A where the flux 22 is applied.” However, even if there is small gap between the flux and the adhesive the adhesive still contacts more than “about 10% to about 60%” of the surface area of the bumps.

The second method of Satoh teaches away from using an adhesive that encompasses only “about 60%” of the bump. When the grooves on all sides of the IC chip have been breached by the grinder the wafer is still being ground. The specification requires the grooves to be deeper than the desired thickness of the wafer. See Column 7, Lines 29-31. Therefore, there will be grinding after the breach of the grooves on the sides of an individual IC chip. One of ordinary skill would understand that the thicker adhesive is necessary to maintain the stability of each

individual IC chip after the grinder has reached the groove depth but is still grinding. One of ordinary skill in the art would understand that the second method of Satoh teaches away from contacting only “about 10% to about 60%” of the surface area of the bumps.

The first method in Satoh also cannot be relied upon to provide a suggestion or motivation to combine with Miyamoto et al. Only the tip of a bump, if any at all, is in contact with the adhesive. Column 8, Lines 1-3. The disclosure of contacting the “tip” of a bump with an adhesive is not sufficient to suggest or motivate contacting “about 10% to about 60%” of the surface area of a bump.

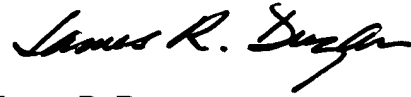
Miyamoto et al. clearly teaches away from contacting less than all of the surface area of a bump. Satoh does not suggest contacting more than the tip of a bump. Therefore, there is no suggestion to combine the references and all of the claim limitations of claim 76 are not taught or suggested by the references. Therefore, claim 76 is not obvious based on Miyamoto et al. in view of Satoh. Claims 77 through 84 depend from claim 76 and are unobvious because the independent claim is unobvious.

Applicants assert that claims 1, 2, 4, 6 through 13, 15, 17 through 23, 25, 27 through 33, 35, 37 through 45, 47, 49 through 51, 53, 55, 56 and 76 through 84 are clearly allowable over the cited prior art.

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Applicants request the allowance of claims 1, 2, 4, 6 through 13, 15, 17 through 23, 25, 27 through 33, 35, 37 through 45, 47, 49 through 51, 53, 55, 56 and 76 through 84 and the case passed for issue.

Respectfully submitted,



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